

CLAIMS

What is claimed is:

1. A transistor device, comprising:
a first transistor segment extending along a first axis; and
5 a second transistor segment extending along a second axis;
wherein the first and second transistor segments are contiguous with one another and wherein the first axis and the second transistor segments are non-coaxial.
- 10 2. The transistor device of claim 1, wherein the first axis and the second axis are perpendicular.
3. The transistor device of claim 2, wherein the transistor device is a MOSFET.
- 15 4. The transistor device of claim 2, wherein at least one of the first axis and the second axis is straight.
5. The transistor device of claim 2, wherein the first transistor segment
20 extends along the first axis between a first end and a second end, and wherein the first end of the first transistor segment is proximate to the second transistor segment.
6. The transistor device of claim 5, wherein the first end of the first
25 transistor segment is proximate to an end of the second transistor segment.
7. The transistor device of claim 5, wherein the transistor device is a MOSFET, wherein the first transistor segment comprises:
a plurality of first source regions formed in a semiconductor body, the first
30 source regions extending on laterally opposite sides of the first axis;

a plurality of first drain regions formed in the semiconductor body, the first drain regions extending on laterally opposite sides of the first axis;

a plurality of first gate structures formed over channel regions of the semiconductor body, the first gate structures extending on laterally opposite
5 sides of the first axis;

a conductive first source interconnect structure extending generally parallel with the first axis from the first end to the second end of the first transistor segment, the first source interconnect structure being electrically coupled with the plurality of first source regions in the semiconductor body; and

10 a conductive first drain interconnect structure extending generally parallel with the first axis from the first end to the second end of the first transistor segment, the first drain interconnect structure being electrically coupled with the plurality of first drain regions in the semiconductor body.

15 8. The transistor device of claim 7, wherein the second transistor segment comprises:

a plurality of second source regions formed in a semiconductor body, the second source regions extending on laterally opposite sides of the second axis;

20 a plurality of second drain regions formed in the semiconductor body, the second drain regions extending on laterally opposite sides of the second axis;

a plurality of second gate structures formed over channel regions of the semiconductor body, the second gate structures extending on laterally opposite sides of the second axis;

25 a conductive second source interconnect structure extending generally parallel with the second axis from the second end to the second end of the second transistor segment, the second source interconnect structure being electrically coupled with the plurality of second source regions in the semiconductor body; and

30 a conductive second drain interconnect structure extending generally parallel with the second axis from the second end to the second end of the second transistor segment, the second drain interconnect structure being

electrically coupled with the plurality of second drain regions in the semiconductor body.

9. The transistor device of claim 1, wherein the transistor device is a
5 MOSFET.

10. The transistor device of claim 1, wherein at least one of the first axis and the second axis is straight.

10 11. The transistor device of claim 1, wherein the first transistor segment extends along the first axis between a first end and a second end, and wherein the first end of the first transistor segment is proximate to the second transistor segment.

15 12. The transistor device of claim 11, wherein the first end of the first transistor segment is proximate to an end of the second transistor segment.

13. The transistor device of claim 1, wherein the transistor device is a MOSFET, wherein the first transistor segment comprises:

20 a plurality of first source regions formed in a semiconductor body, the first source regions extending on laterally opposite sides of the first axis;

a plurality of first drain regions formed in the semiconductor body, the first drain regions extending on laterally opposite sides of the first axis;

25 a plurality of first gate structures formed over channel regions of the semiconductor body, the first gate structures extending on laterally opposite sides of the first axis;

a conductive first source interconnect structure extending generally parallel with the first axis from the first end to the second end of the first transistor segment, the first source interconnect structure being electrically coupled with
30 the plurality of first source regions in the semiconductor body; and

a conductive first drain interconnect structure extending generally parallel with the first axis from the first end to the second end of the first transistor segment, the first drain interconnect structure being electrically coupled with the plurality of first drain regions in the semiconductor body.

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14. The transistor device of claim 13, wherein the second transistor segment comprises:

a plurality of second source regions formed in a semiconductor body, the second source regions extending on laterally opposite sides of the second axis;

10 a plurality of second drain regions formed in the semiconductor body, the second drain regions extending on laterally opposite sides of the second axis;

a plurality of second gate structures formed over channel regions of the semiconductor body, the second gate structures extending on laterally opposite sides of the second axis;

15 a conductive second source interconnect structure extending generally parallel with the second axis from the second end to the second end of the second transistor segment, the second source interconnect structure being electrically coupled with the plurality of second source regions in the semiconductor body; and

20 a conductive second drain interconnect structure extending generally parallel with the second axis from the second end to the second end of the second transistor segment, the second drain interconnect structure being electrically coupled with the plurality of second drain regions in the semiconductor body.

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15. The transistor device of claim 1, wherein the transistor device has an effective aspect ratio greater than about 5.

16. The transistor device of claim 1, wherein the transistor device has
30 an effective aspect ratio greater than about 10.

17. A transistor device, comprising:
a plurality of contiguous transistor segments, individual transistor
5 segments extending along a corresponding segment axes, wherein at least two
of the segment axes are at a non-zero angle with respect to one another.
18. The transistor device of claim 17, wherein the transistor device has
an effective aspect ratio greater than about 10.
- 10 19. The transistor device of claim 17, wherein at least one of the
segment axes is straight.
20. The transistor device of claim 17, wherein the transistor device is a
15 MOSFET.
21. The transistor device of claim 20, wherein the transistor segments
individually comprise:
a plurality of source regions formed in a semiconductor body, the source
20 regions extending on laterally opposite sides of a corresponding segment axis;
a plurality of drain regions formed in the semiconductor body, the drain
regions extending on laterally opposite sides of the corresponding segment axis;
a plurality of gate structures formed over channel regions of the
semiconductor body, the gate structures extending on laterally opposite sides of
25 the corresponding segment axis;
a conductive source interconnect structure extending generally parallel
with the corresponding segment axis from a first end to a second end of the
transistor segment, the source interconnect structure being electrically coupled
with the plurality of source regions in the semiconductor body; and
30 a conductive drain interconnect structure extending generally parallel with
the corresponding segment axis from the first end to the second end of the

transistor segment, the drain interconnect structure being electrically coupled with the plurality of drain regions in the semiconductor body.